I'm not saying that all doors are closed in regard to turf bioengineering. Yes, the avenue of herbicide-resistant varieties has been derailed for five or 10 years. But advancements in drought, pest, and stress tolerance from bioengineering could begin appearing on the market as soon as 2005.

Doug Brede, Ph.D., is research director for Jacklin Seed and Medalist America, the turf seed branch of the J.R. Simplot Company in Idaho. His team of scientists and breeders have released over 40 popular turf cultivars in recent years. Brede has written over 100 articles on turfgrass and related subjects. His latest venture is a book on how to reduce your turf maintenance, due out in the fall. Turfgrass TRENDS subscribers can save $20 off the cover price by ordering early from Ann Arbor Press at (734) 475-8787.

RESEARCH SUMMARIES

Controlling June Beetle Grubs, with surface-applied insecticides. *Research conducted by Dr. Rick Brandenburg, NC State University.*

Several different treatments were evaluated for control of green June beetle grubs (Cotinus nitida L.) on a bermudagrass fairway at the Quali Ridge Golf and Country Club in Sanford, NC.

Turfgrass on the site was mowed at 7/8-inch, with 1/4-inch of thatch present. The soil was classified as "sandy loam" with pH of 5.6 and 0.51 percent humic matter.

Plots 10ft. x 10 ft. were established in an area with a historyof green June beetle infestations and treatments (replicated four times) were randomly assigned to the plots. All liquid insecticides were applied using a CO_2 backpack sprayer delivering approximately 30 gpa, operating at 40 psi.

Granular insecticide formulations were applied using a handheld Republic EZ Handscpreader. All treatments except for Orthene 75S received approximately 0. inches of water immediately after application of insecticides.

All plots were oversprayed on 29 September with a 5.0 lb. ai/acre rate of Sevin 80 -S, and were evaluated on September 30 by counting all the dead grubs on the surface within two $1m^2$ frames randomly placed in each plot. Dead grubs from the Sevin overspray are assumed to have survived the "initial test" treatment. The average number of grubs counted per lm^2 in each plot are reported in Table 1.

All data were transformed (square root of X+ 0.05) prior to ANOVA and DNMRT.

Actual means are presented in tables.

Results and discussion

Sampling showed treatments using Oftanol 5G provided greater control than both treatments using Orthene 75S and treatments using CGA-293343 2SC at the 10- and 20-ox. rates. Only the Oftanol and CGTA-293343 2SC at the 15-oz. rate provided a significant reduction in grubs.

TABLE 1.

Treatment	RATE (LB AI/A)	TARGET	—grubs per 2 m^2 per plot				
			REP 1	REP 2	REP 3	REP 4	AVERAGE
Orthene 75S	3.0	1 st instar	22.00	20.00	18.00	31.00	22.75 bc
Orthene 75S	5.0	1 st instar	32.00	17.00	12.00	35.00	24.00bc
CGA-293343 2SC	10 fl. oz.	1 st instar	42.00	37.00	58.00	10.00	36.76 c
CGA-293343 2SC	15 fl. oz.	1 st instar	3.00	41.00	7.00	16.00	16.75 ab
CGA-293343 2SC	20 fl. oz.	1 st instar	14.00	16.00	26.00	22.00	19.50 bc
Oftanol 5G		1 st instar	6.00	9.00	3.00	2.00	5.00 a
Untreated	———	1 st instar	35.00	41.00	25.00	33.00	33.50 c

Means followed by the same letter are not significantly different (DNMRT, P=0.05)

Journal Abstracts

American Entomologist
Extension Entomology: A Personal Perspective; Past, Present and Future Challenges *Author: R. L. Bradenburg, Professor of Entomology, North Carolina State University, Raleigh, NC.*

AFTER 17 YEARS as an extension entomologist, Brandenburg reflects on the direction and focus of the Cooperative Extension Service. Extension personnel today have to deal with issues associated with integrated pest control, low-input sustainable agriculture, chemophobia, reductions in funding, downsizing, justifying their existence and expanding educational programs to urban audiences. Regardless, Brandenburg believes that existing opportunities exist for Extension and the book is far from closed. The author makes observations on four topics:

Extension can help meet the needs of society through partnerships with other agencies and industries, requiring more linkages than before.

1) Extension's handling of controversial topics;
2) Extension's value in an increasingly urbanized world;
3) Extension's ability to align technological transfer with the needs of end users;
4) Extension's initiative to provide education about certain key issues to improve its leadership role and support its claim that it is an invaluable resource.

Handling of Controversy

Recently, the public has expressed concern about pesticide use in urban and agricultural environments. We, in Extension, have invested much time dealing with this issue. Unfortunately, much of our effort has focused upon minimizing the risks associated with pesticides by comparing the low number of pesticide-related deaths caused by other, more common risks. Increasing the public's awareness of other dangers does not necessarily lessen their concerns about pesticides. Several authors have discussed our general lack of appreciation for and understanding of the need for appropriate communication skills to enlighten the public about risks associated with the pesticide issue. Because extension specialists usually focus on technological transfer, our expertise in dealing with emotional issues, such as pesticide use, is often limited. We must improve out risk-communication skills if we expect to establish our credibility with the public.

Value in an Urbanized World

Extension's value is not evident to the general public because it addresses the public's needs indirectly toward producers, and our role is not clearly understood by most urban audiences. In fact, our role is not always evident to the agricultural community. Many readers of farm magazines do not realize that university specialists write or are the source for many articles in farm magazines.

Extension can help meet the needs of society through partnerships with other agencies and industries, requiring more linkages than ever before.

As a member of a team, Extension is challenged to maintain its visibility, particularly to appointed agricultural officials and legislators who have advocated severe cuts or elimination of Extension.

Currently we are putting more effort into communicating our relevance to the American public and increasing our grassroots support through greater emphasis on urban issues. Extension attempts to document its benefit to society. However, the impact of our educational efforts and the information we provide often is difficult and costly to evaluate. It is important for those of us in Extension to realize that we are in a country in which only a portion of our population has any connection to farming. As the percentage of the general pub-

lic involved in agriculture decreases, the challenge becomes educating an unfamiliar urban public about the value of Extension.

Meeting End User Needs

My greatest challenge has been whether farmers will accept the content of teducational programs for IPM. Perhaps, I and other specialists do not understand completely the factors that compete for a grower's time, energy, and resources. I believe that IPM tactics would be embraced more completely under a different scenario.

Extension entomologists often are the facilitators between those who develop the concepts of IPM and the pragmatic individuals who apply them.

We structure educational programs that fit the concept of IPM but do not meet the client's needs. Such programs might not fit the farming situation and might be incompatible with profitable cultural practices We should deliver education about technologies to growers with a sound, logical, and open-minded approach

Key Issue Education

Extension must take the initiative to educate our clients about key agricultural issues. Extension entomologists must incorporate IPM with sustainable agriculture. New technologies, such as transgenic plants, insect growth regulators, and reduced risk pesticides, add a sense of excitement to our educational opportunities. We should establish guidelines and suggest rules rather than wait for individuals less familiar with agriculture to do so. No other group has the infrastructure, expertise, unbiased perspective, and trust to conduct this mission.

Extension specialists should voice their opinions about prescriptive pesticide use and determine how much visibility we want as this issue is debated. Extension assumed a similar responsibility in many states when we accepted leadersip for the pesticide certification training program.

In Future Issues

- Herbicide control based on soil temperature degree days
- N and turf, reconsidered
- Disease control today, out look for tomorrow
- Reducing crabgrass germination
- More research summaries